



# Evaluation of fear, willingness to seek care, and healthcare delivery preferences for patients with nephrolithiasis during the COVID-19 pandemic

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**Background:** Although minimal is known about coronavirus disease 2019 (COVID-19)'s impact on patient healthcare perceptions, improved understanding can guide healthcare providers to adequately address patient concerns. This cross-sectional study investigated how fear induced by COVID-19 impacted nephrolithiasis patients' perceptions, decision-making, and preferences for care delivery.

**Methods:** Utilizing the validated Fear of COVID-19 Scale (FCV-19S), patients were surveyed at a single stone clinic during part of the COVID-19 pandemic, 03/2021–04/2022. One-way analysis of variance (ANOVA), Chi-square tests, and multinomial logistic regression evaluated the effect of sociodemographics on responses.

**Results:** Two hundred and four surveys were completed. Mean age was 58±16 years, and 112 (54.9%) were women. Mean FCV-19S was 14.8±5.8 points (range, 7–33). Women and non-Caucasian races were associated with higher fear scores (P<0.01 and P=0.01 respectively). Stone prevention effort was not associated with fear (P=0.38). Poorer self-assessed health status was associated with increased stone prevention efforts (P=0.04). Preference for in-person care was reported in 89% of patients. Willingness to seek care varied by age and education, with decreased likelihood to seek care for middle-aged patients (P=0.04) and increased education (P=0.01).

**Conclusions:** Perceived fear during the COVID-19 pandemic was highly variable in nephrolithiasis patients, with higher fear scores in women and non-Caucasians. Willingness to seek care during the pandemic varied with age, education level, symptom severity, COVID-19 fear, current stone status, and health status. Stone patients greatly preferred in-person medical care over telemedicine during COVID-19. Future studies are needed to further evaluate these health disparities, discrepancies in fear, and comfort in seeking stone-related healthcare to help us better inform health policymakers and provide patient-centered care.

**Keywords:** Nephrolithiasis; coronavirus disease 2019 (COVID-19); patient preferences; healthcare delivery

Submitted Dec 06, 2023. Accepted for publication Apr 02, 2024. Published online Jun 25, 2024.

doi: 10.21037/tau-23-627

View this article at: <https://dx.doi.org/10.21037/tau-23-627>

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## Introduction

### Background

Early during the coronavirus disease 2019 (COVID-19) pandemic, the United States utilized various measures to decrease the rapid rate of infectious spread. There was widespread implementation of COVID-19-specific urologic prioritization and treatment of patients based on urgency for care (1). Ultimately, this resulted in a 20–70% decrease in overall patient volume in urology for both urgent and non-urgent conditions (2–4). To date, research has been focused on case volume and factors specifically related to the physician side of healthcare, with minimal emphasis on patient-centered perspectives (5–9). In this study, we sought to better understand how this major pandemic influenced patient thoughts and fears about obtaining urologic care for nephrolithiasis.

### Rationale and knowledge gap

Patient fear has been evaluated by medical specialties; however, limited information is available for surgical patients, including urology (10–15). To date, there are only two published reports on nephrolithiasis patient perceptions during the pandemic. The first, by Wong *et al.*, evaluated stone-related quality of life (QOL) and found an inverse

relationship between fear and QOL (16). Another study investigated patient preferences for nephrolithiasis care during the pandemic and revealed that patients were more negative and anxious with a shift away from in-person evaluations (17). Although these two studies have increased our understanding, additional studies are still needed to address patient perceptions and healthcare preferences during a pandemic. We, therefore, developed a patient survey, with a validated fear of COVID-19 questionnaire, to further elucidate patient factors associated with increased fear, patient preferences for stone care, as well as their perceptions of the pandemic.

### Objective

Our objective was to improve our understanding to ensure that healthcare systems adequately address patient concerns, comfort-seeking care behavior, and health disparities during times of mass crises. We present this article in accordance with the STROBE reporting checklist (available at <https://tau.amegroups.com/article/view/10.21037/tau-23-627/rc>).

## Methods

### Study background and design

We developed a 23-question survey to evaluate patients with nephrolithiasis and their perceptions of stone care during COVID-19 (Appendix 1). The Fear of COVID-19 Scale (FCV-19S) was also utilized (18–23). FCV-19S scores ranged from 7 to 35 points, with higher scores corresponding to increased patient-perceived fear. The primary outcome variable was the cumulative FCV-19S score with each question having equally weighted scores.

### Data collection

This study was approved by the University of Florida's IRB (No. 202100584). All methods were carried out in accordance with their regulations and Declaration of Helsinki (as revised in 2013), and informed consent was obtained from all subjects. Patients who presented for an in-person appointment at our academic medical center's Monday nephrolithiasis clinic between 03/2021–04/2022 were eligible for participation in this cross-sectional study, based on research staff availability. Inclusion criteria were age >18 years, English-speaking, and either current or prior history of stone disease. Patients were administered the

### Highlight box

#### Key findings

- Utilizing the validated Fear of coronavirus disease 2019 (COVID-19) Scale, we found that women and non-Caucasian races were associated with higher fear scores during the pandemic.
- Most nephrolithiasis preferred in-person care over telemedicine visits.

#### What is known and what is new?

- The COVID-19 pandemic altered the way healthcare delivery was provided, with reports of up to a 70% decrease in overall urology patient volume.
- We sought to better understand how this major pandemic influenced patient preferences and fears about obtaining urologic care, specifically for nephrolithiasis.

#### What is the implication, and what should change now?

- We should recognize that patients with nephrolithiasis experienced significant levels of fear during the pandemic and were more likely to prefer in-person healthcare delivery. Therefore, we should value these patient perspectives and cater our healthcare delivery practices to best fit these preferences.

**Table 1** Patient demographics & health status

Variable	Response, N (%)
Gender	
Female	112 (54.9)
Male	92 (45.1)
Race	
Caucasian	179 (87.7)
Other	25 (12.3)
Hispanic, Latino, or Spanish origin	12 (5.9)
Preferred language	
English	196 (96.1)
Spanish	8 (3.9)
Occupation	
Employed	75 (36.8)
Retired	75 (36.8)
None, disabled, or student	51 (25.0)
Unknown	3 (1.5)
Education level	
High school or below	163 (79.9)
College or above	41 (20.1)
Self-perceived health status	
Poor	0
Fair	27 (13.2)
Good	88 (43.1)
Very good	89 (43.6)
Excellent	0

survey at the end of their clinic visit.

### Statistical analysis

All analyses were conducted using R Statistical Software (v4.1.0, Bell Laboratories, Lucent Technologies, Vienna, Austria). Sociodemographics and survey responses were categorized into sublevels by pre-defined criteria. The Chi-square test of Independence, one-way, and two-way analysis of variance (ANOVA) tests were utilized. Levene's test evaluated the homogeneity of data variances required by ANOVA. The Tukey honestly-significant difference *post hoc* test was conducted to run pairwise comparisons among

each of the categories and use a conservative error estimate to determine the categories which are statistically different from one another.

To determine predictors of willingness to seek care, multinomial logistic regression was performed. This analysis was to understand the willingness to seek care based on other multiple independent variables of responses, with the "equally likely to seek out medical care" as the baseline category. In addition, we tested different models with sociodemographics together as a block to determine whether any of the effects were significant while controlling for the other sociodemographic variables in analysis.

### Results

During the study period, all patients were offered an in-person or telehealth appointment. Only 1.67% of our stone patients opted for a telehealth appointment. Based on research staff availability, 210 in-person patients were screened, with 204 (97.1%) opting to participate in the study and 6 (2.9%) declining. The average age was 58±16 years, and 112 (54.9%) of the participants were female. Baseline patient characteristics are depicted in *Table 1*. Current kidney or ureteral stones at the time of the survey were reported by 69 patients (33.8%). The remaining 135 patients (66.2%) had a history of prior stone disease without active symptoms. Number of previous stone events varied, with no prior events in 23 (11.3%), 1–5 stone events in 109 (53.4%), and >5 stone events in 65 (31.9%). When asked to self-report their perceived health status, most patients reported either "Good" (88 patients, 43.1%) or "Very Good" (89 patients, 43.6%) health (*Table 1*).

### Fear of COVID-19

The average FCV-19S score was 14.8±5.8 points (range, 7–33). Fear scores were similar in patients with and without current stones (14.4±5.6 *vs.* 15.4±6.2; *P*=0.33). When comparing genders, the mean FCV-19S score was higher in women than men (16.1±6.3 *vs.* 13.2±4.7; *P*<0.01). Race was also associated with FCV-19S score disparity, with non-Caucasians having higher fear scores (17.4±6.1 *vs.* 14.4±5.7; *P*=0.01). Age, occupation, and preferred language were not associated with fear (*P*=0.86, *P*=0.10, and *P*=0.35, respectively).

A multilevel ANOVA was designed to evaluate the association between levels of COVID-19 fear, patient

**Table 2** Multilevel predictors of COVID fear

Variable	Mean Sq	P value
Race	206.5	0.007
Gender	409.8	<0.001
Education	72.1	0.08
History of stone events	70.2	0.06
Health status	25.8	0.40
Race: health status	118.2	0.02
Race: gender: stone history	90.9	0.04
Gender: stone history: health status	101.1	0.01

COVID, coronavirus disease.

**Table 3** Multinomial analysis for willingness to seek care

Variable	Less likely to seek care	More likely to seek care
Education		
College or above	-2.27*	-8.69*
High school or below	-2.44*	-9.25*
Health status		
Good	-0.17	-0.44
Very good	0.04	-0.28
Current stones		
Yes	25.6*	28.2*
No	25.1*	28.7*
Symptoms during COVID		
Better	-33.2*	-1.363*
Same	-31.4*	-0.97*
Worse	-33.4*	0.35
COVID fear	0.04	0.15*

Odds ratios based on baseline category set as, 'the equally likely to seek out medical care'. \*, all variables with an asterisk have P value <0.05. COVID, coronavirus disease.

demographics, and self-reported health status (Table 2). There was no significant temporal association in COVID-19 fear scores throughout the 13-month study period. This was further denoted by participants being grouped into early (03/2021–07/2021), middle (08/2021–12/2021), and later (01/2022–04/2022) COVID-19 study periods based on date of survey completion (P=0.28).

### COVID-19 influence on decision to seek care

Of patients who had stone symptoms during the pandemic, most reported that COVID-19 did not influence their decision to seek stone care (68.6% equally as likely, 21.8% less likely, and 9.68% more likely). However, patient willingness to seek care varied by age and education, with decreased likelihood to seek care for middle-aged patients (P=0.04) and patients with increased education (P=0.01). Multinomial regression was performed to assess predictors of willingness to seek care, with the reference being assigned to participants that were "equally as likely" to seek care (Table 3). Health status did not show a significant relationship with likelihood to seek care compared to the reference category. Patients with a high COVID fear value had a higher likelihood of being more likely to see care than those with low COVID fear. Patients with worse stone symptoms were more likely to seek care compared with those with better or same stone symptoms prior to the pandemic. Patients with current known stones appeared to be equally as likely to seek care. The variables of education and stone symptoms being improved or the same during the COVID pandemic were equally as likely to seek care.

When asked if vaccination against COVID-19 would influence decision to seek stone-related medical care during the pandemic, 135 (69.2%) reported "No", 44 (22.6%) reported "Yes", and 16 (8.2%) reported "Unsure". Higher fear scores were seen in patients who answered "Yes" or "Unsure" when asked if the COVID-19 vaccine would influence their decision to seek stone-related medical care ("Yes" 18.9±6.3 vs. "Unsure" 15.0±4.3 vs. "No" 13.7±5.2; P<0.01).

### Patient preferences for stone care delivery & prevention efforts

Most patients did not feel that access to stone care was more difficult to obtain during the pandemic [141 (72.3%) "No", 32 (16.4%) "Yes", and 22 (11.3%) "Unsure"]. Most participants preferred in-person (n=138, 89.6%) care for their stone disease management, while a minority preferred telehealth (n=14, 9.1%), and even fewer were indifferent (n=2, 1.3%). There was no association between patients' preferred method of stone care delivery and fear (P=0.69) or gender (P=0.05). Age was associated with variable care delivery preferences (P=0.01). Most notably, middle-aged patients were the most common to report a preference for telehealth (14.7%), despite self-selecting an in-person

visit (0% for <40 years, 14.7% for 40–59 years, and 5.6% for 60+ years).

Participants were also asked about urinary stone prevention efforts during the pandemic. Prevention efforts during COVID-19 increased in 50 (24.9%), decreased in 4 (2.0%), and were unchanged in 147 (73.1%). Although stone prevention effort was not associated with COVID-19 fear ( $P=0.38$ ), poorer self-assessed health status was associated with increased effort to prevent stones ( $P=0.04$ ).

## Discussion

COVID-19 has changed the way we deliver healthcare; however, limited research has elucidated the patient-centered outlook of this pandemic. Our study was designed to assess the perspective of these patients and understand their fear and care preferences during these unprecedented times. We believe this to be the first study to date that evaluates nephrolithiasis patients' perceived health status, willingness to seek care, stone prevention efforts, preferences for care delivery modality, and perceptions about stone care during the pandemic. Findings from this study can help us to better understand our diverse patient population and help guide the formulation of future health policies to assist in both times of pandemic as well as other, less-severe circumstances.

Although other specialties have evaluated patient COVID-19 fear, there are limited reports in surgical fields including urology (10–16). To date, studies have shown there to be increased fear in females, older patients, and those with more severe baseline levels of anxiety (13,24,25). Findings from our study were similar to these previous reports regarding gender, with higher COVID-19 fear in female nephrolithiasis patients (13,16,24). This highlights a potential gender disparity in patient-experienced fear, across multiple health conditions. Further research is essential to ensure that medical providers from all fields are appropriately addressing this potential healthcare disparity.

When comparing our study to Wong *et al.*'s, we must consider that their FVC-19S scores were converted to a 100-point scale, unlike the raw scores reported in our study (16). When converted back to baseline, their average scores are only slightly higher at ~16.5 *vs.* 14.8 in our study. This potential variation in COVID-19 fear may be in part due to differences in the status of the pandemic at the time of survey administration. Their survey was conducted during early 2020, whereas ours was in 2021–2022. Interestingly, we did not find there to be a temporal

association between COVID-19 fear score and survey date in our study. Although this suggests that COVID-19 fear in nephrolithiasis patients did not change during our studied portion of the pandemic, our sample size was relatively small for each time-period. Also, these groupings were not based on pandemic surges or variant waves. Further investigations are needed to evaluate if stone patients' fear of COVID-19 changed over time throughout the pandemic or during COVID-19 variant surges.

With the increased emphasis on safety and social-distancing guidelines, telehealth quickly became increasingly utilized in urology practice (26,27). However, relevant discussions are still needed to address telemedicine's utility and how it can be most effectively utilized beyond pandemic times. Regardless of our own perceptions of telehealth as healthcare providers, patient perspectives are equally important, but currently limited, especially within nephrolithiasis patients.

Some studies have suggested an association between demographics and telemedicine use (28,29). In our study, only a few patients opted for telemedicine, comprising less than 2% of our stone visits. Interestingly, 11% of patients at the in-person visit reported a preference for telemedicine, even though they had personally been offered and declined a telemedicine appointment. These examples point us to believe that telemedicine preference may be more disease-specific rather than solely demographic-dependent. Although not studied here, other potential factors that may influence patient preference for care delivery method include travel distance, resource limitations (i.e., access to internet), imaging needs, disease severity, and patient perception or interest in obtaining a surgical procedure. Future studies should evaluate these patient variables to determine if they impact appointment type preferences and may further help explain the discordance seen in our own study, with 11% of patients preferring telehealth although they selected an in-person visit. This may allow us to both offer and provide improved patient-centered care.

Questions still remain about how the landscape of telemedicine may adapt beyond the pandemic. According to a 2021 study by Heeno *et al.*, only 36.4% of phone consultation patients would be satisfied with such healthcare delivery in the future (28). Some have endorsed nephrolithiasis as an ideal candidate condition for telemedicine. Although approximately 54–84% of urologic patients may be eligible for telehealth, our study emphasizes that stone patients remain extremely motivated to receive in-person care (30). These findings

are contradictory to our pre-survey perception that telehealth would be preferred by many and are also in contrast to Boehm *et al.*'s findings of an 84.7% urologic patient preference for telemedicine (29). Based on the strong preference for in-person care, as evidenced by our survey results and the low percentage of patients electing for telehealth overall, we predict that the future of nephrolithiasis care will be telemedicine-friendly, but not necessarily telemedicine predominant. These surprising findings underscore the importance of asking and understanding patient preferences for care delivery for specific medical conditions.

To our knowledge, only one other study to date has evaluated nephrolithiasis patient care preferences during the pandemic. Jiang *et al.* evaluated a social media forum, Redditt, and found there to be an increase in use of medical expulsive therapy or observation and a decrease in operating room interventions during the pandemic (17). This study mentions increased anxiety for in-person care, which is in contrast to our findings that stone patients preferred in-person visits. We also found no difference in COVID-19 fear scores for those preferring telemedicine *vs.* in-person visits, suggesting that fear may not be a major driver for patients' preferred care delivery method.

### Limitations

Only patients who presented for an in-person appointment at a single institution were eligible. We were unable to draw conclusions on patient preferences for those who cancelled or opted for telehealth. Data was not available from the early stages of the pandemic in 2020, nor were we able to stratify our survey results to account for different COVID-19 surges. Future studies could evaluate if patients who cancelled or utilized telehealth have different fear levels. We also did not evaluate stone characteristics, baseline anxiety, or changes in fear during treatment or the pandemic. Future projects could evaluate how these variables impact patient fear, as well as fear changes during stone treatment.

### Conclusions

COVID-19 fear was highly variable in nephrolithiasis patients during COVID-19. Gender, race, stone history, and patient-reported health status were predictive of fear. Willingness to seek care during the pandemic varied with age, education level, symptom severity, COVID-19 fear,

current stone status, and health status. Patients with poorer health status increased stone prevention efforts. Stone patients greatly preferred in-person medical care over telemedicine during COVID-19 based on their predilection to chose in-person visits despite having the option for telehealth. Future studies are needed to further evaluate these health disparities, discrepancies in fear, and comfort in seeking stone-related healthcare to help us better inform health policymakers and provide patient-centered care.

### Acknowledgments

*Funding:* None.

### Footnote

*Reporting Checklist:* The authors have completed the STROBE reporting checklist. Available at <https://tau.amegroups.com/article/view/10.21037/tau-23-627/rc>

*Data Sharing Statement:* Available at <https://tau.amegroups.com/article/view/10.21037/tau-23-627/dss>

*Peer Review File:* Available at <https://tau.amegroups.com/article/view/10.21037/tau-23-627/prf>

*Conflicts of Interest:* All authors have completed the ICMJE uniform disclosure form (available at <https://tau.amegroups.com/article/view/10.21037/tau-23-627/coif>). B.B.W. reports that she is a clinical consultant for Boston Scientific (paid) for presentation preparation about holmium laser; for Mokan Labs, LLC (paid) for scientific review; and for Integrated DNA Technologies (paid) for presentation at national academic scientific meeting. The other authors have no conflicts of interest to declare.

*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. This study was approved by the University of Florida's IRB (No. 202100584). All methods were carried out in accordance with their regulations and Declaration of Helsinki (as revised in 2013), and informed consent was obtained from all subjects.

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**Cite this article as:** Whiles BB, Reich DA, Green J, Yu F, Bird VG. Evaluation of fear, willingness to seek care, and healthcare delivery preferences for patients with nephrolithiasis during the COVID-19 pandemic. *Transl Androl Urol* 2024;13(6):962-969. doi: 10.21037/tau-23-627